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UNITED STATES DEPARTMENT OF AGRICULTURE
Agricultural Research Service
Office of the Administrator
Washington, D. C.

REPORT AND RECOMMENDATIONS
of the
FARM RESOURCES RESEARCH ADVISORY COMMITTEE
Developed at its First Meeting
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Mississippi

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Additional copies of this report may be requested from David J. Ward,
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PREFACE

The Committee reviewed an annual Progress Report and other working materials relating to the Department's research in the fields covered by this report. Research leaders briefly described the research programs and defined important research needs. Some Federal and State scientists in Mississippi described field and laboratory research and gave several on-site demonstrations of procedures, achievements, facilities, and problems yet to be solved. Several representatives of public groups concerned with soil and water conservation discussed needs for research.

The comments and recommendations of the Committee represent its reaction to existing work and to needs for additional research. The Committee recognizes that it is not its responsibility to delineate between research to be conducted within the Department and that to be conducted in cooperation with State agricultural experiment stations and other research agencies. The recommendations made are in terms of important problems on which research is needed and in which the Department should participate.

Dr. N. C. Brady, USDA Director of Science and Education is Chairman of the Committee; Dr. H. A. Rodenhiser, Deputy Administrator for Farm Research is Vice-Chairman.

COMMENTS AND RECOMMENDATIONS

GENERAL

The Committee again emphasizes that it is unrealistic to expect the present level of support for agricultural research to furnish all of the information needed by such a large and complex industry. Every effort should be made to better acquaint the general public with the benefits derived from agricultural research and to solicit their support for a large enough program to serve the best interests of our entire society and for future economic growth and development of the Nation.

The Department is commended for its effort to strengthen basic research. We are pleased with the progress that has been made to date. Results from basic research are the key to effective solutions of applied problems. More emphasis should be given to the search for new knowledge, particularly in those fundamental fields of study that directly relate to a number of problem-oriented areas.

It is recommended that special emphasis in the research effort be placed on those problems requiring high cost facilities, equipment and teams of research personnel (often from various disciplines) to provide satisfactory answers and solutions. The Department should also concern itself with areas of research which because of lack of promise of immediate industrial application are not or may not be pursued by private industry. Results from such research should have national, or at least regional, application. This recommendation is not intended to exclude any type of research, but it is recognized that problems amenable to individual efforts and modest physical facilities in many cases can be handled by scientists in universities and other institutions.

A large part of the Department research program is cooperative with other Federal and State research groups and agencies. A team approach that includes scientists and engineers from many disciplines is becoming increasingly important for effective solution of today's complex problems. To help assure that the best minds are focused on the problems, and avoid unnecessary duplication of effort and facilities, the establishment of "technical research committees" is urged for planning, reviewing, and coordinating particular research efforts. This is already being done in many areas but there is room for improvement. For example, the Committee was impressed with the program at the U. S. Sedimentation Laboratory, but was disappointed to find that there is no technical advisory committee to the Laboratory. The results being obtained have national application. Over time, the program will not be as effective as it could be and others will not use the information to the extent that it should be, unless there is provision for closer cooperation and coordination of the overall program.

The Committee strongly supports continued implementation of the program of support for soil and water research outlined in Senate Document No. 59, 86th Congress. We are pleased that several important facilities have been provided. But, we are concerned that at the present rate, many years will be required to initiate studies and obtain information that is urgently needed today to plan and develop effective natural resource programs. The Department is urged to aggressively seek budgetary and appropriation support for an orderly and expeditious funding of the highest priority items in the current list.

Throughout the deliberations of the Committee, reference was made time and again to the need for economic evaluation of programs and practices. Although the Committee did not have the opportunity to review the effort going into the economic evaluation of alternate program choices for the use and control of our natural resources, it appears that this important area of work is not receiving the attention it deserves. Effective solution of these complex problems requires the combined and coordinated effort of physical and social scientists. We urge review of the present economic program and that steps be taken to strengthen this area of work if found inadequate.

The Department is commended for establishing the position of Director of Science and Education. We urge continued effort for Congressional action to have this position raised to the rank of Assistant Secretary of Agriculture, as recommended by the President's Science Advisory Committee, Life Sciences Panel.

SOIL AND WATER RESEARCH AND SOIL SURVEY INVESTIGATIONS

(The Committee reviewed the entire programs of the Soil and Water Conservation Research Division and Soil Survey Investigations.)

Continuing emphasis should be placed on the soil and water research program of the Agricultural Research Service and the soil survey investigations of the Soil Conservation Service in order to fulfill the broad responsibilities of the Department.

It is recognized that shifts in emphasis among the various items in the soil and water field become necessary from time to time. The Committee is pleased that some progress has been made in bringing research in existing soil and water research facilities to a more effective operating level. This is believed to warrant a higher priority than additional new facilities. We commend the Department for moving priority 35 (increased operating funds for existing work at field stations in major land resource regions) in Senate Document 59, 86th Congress, to priority 25. Many of the cooperative programs (more than 75 percent at State agricultural experiment stations) are now inadequately supported for maximum efficient use of manpower and facilities. It is also noted that other priority changes have been made in response to recommendations made by the Committee last year. The Committee again recommends that the Department continually review present priorities for facilities and programs to assure that the most important and urgent problems get high priority.

It appears that the present program is generally well balanced and is directed toward research and results in the areas of greatest importance.

In evaluating the research program, the research needs were categorized in the following manner:

Efficient and Economical Agricultural Utilization of Available Water and Nutrients

There is extreme need for intensive research studies of soil-water-plant relationships to make optimum use of the Nation's soil and water resources for present and future conditions. Continuing research programs concerned with soil moisture, hydraulics, irrigation and drainage principles, wind and water erosion, as well as soil surveys and plant nutrition studies, must be maintained to permit the production of agricultural products to meet present and ultimate domestic and foreign demands for food, feed, and fiber.

The Committee is pleased to note that the Department has re-evaluated its fertilizer technology program as recommended last year. We urge a continuing effort to further reduce the emphasis on phases of this work as may be indicated by achievements being made by other research efforts.

Conservation of Available Water Supplies in Source Areas

The need for research in order to make proper present and future use of the resources of smaller watersheds becomes more acute as feasible reservoir sites are used. Such sites are a valuable resource. They are limited in number. Every effort should be made to obtain information that will lead to conserving and using them efficiently. This points up the value of sedimentation research which should be continued.

Studies of basic hydrology and water and wind erosion along with further studies of the moisture and other qualities of our watershed areas must be furthered if the Nation is to prevent losses due to poor, short-sighted resource management.

Ground Water Reservoir Utilization

Continuing use and overdrafts on the underground water supplies in many areas make it imperative that research in use and recharge methods be furthered to the end that we may make the best possible use of this valuable resource. This will require studies of soil properties and soil survey investigations to determine suitable areas for conjunctive surface and underground water usage. Inherent difficulties in recharge should be studied intensively in an effort to secure the most economical storage and withdrawal of water.

Drainage of Soils and Investigation of Saline Soil and Water Problems

Continuing research in the field of drainage, crop relationships to salt conditions and the reclamation of damaged lands is very important. History strongly indicates that a successful agriculture cannot long exist without due regard for soil drainage. Research must increase proportionately as the varied demand for land use grows, if the United States is to avoid losing the use of valuable land resources. Knowledge of soil-water-plant relationships is important if we are to develop crops and practices to fit specific situations. Soil survey investigations assist in choosing drainage methods and proper crop patterns as well as in solving problems relating to soils in fields other than agriculture.

Criteria for Design of Facilities for Capture, Transportation and Use of Water

Additional research in watershed protection to develop improved techniques in hydrology and soil-water relationships is necessary if the United States is to continue to more efficiently develop available water and land resources.

Impoundment, distribution, and use facilities require constant and additional research to develop practical and economical means of making water available for use. The Committee calls particular attention to the importance of a strong research program to constantly improve design and construction standards for the many facilities contemplated by the Small Watersheds Program (P.L. 556) of the Department.

Soil Survey Investigations

An accurate up-to-date inventory of soil resources is essential for long time effective planning, development and use of land by all segments of our society. To complete soil surveys for the entire country in the next 15 years is no small task, but this should be done sooner if at all possible.

The importance of soil survey information for agricultural uses is well recognized. An expanded soil survey investigation program is also needed to provide basic facts for users of soil maps such as engineers and planners engaged in rural and urban area development, tax assessment, and highway construction. Also more effort is needed to hasten publication of soil survey reports and to develop information that will result in a better public understanding of the many uses that can be made of survey information in land and water resource planning and development.

AGRICULTURAL ENGINEERING RESEARCH

(The Committee reviewed those parts of the Agricultural Engineering Research Division program that are not commodity oriented; i.e., cross-commodity in scope.)

Cross-Commodity Activities

The Department is commended for its cross-commodity agricultural engineering activities. It is recommended that other research divisions further avail themselves of the capabilities of the Agricultural Engineering Research Division in the task force team approach to current problems. It is considered that the use of engineers in initial project development; mechanization and automation of project activity and data treatment; and the development of the economic use of findings through a means of machine production, handling, and/or processing of the end product would improve the effectiveness of research projects. This procedure would assure practices consistent with present usage in other areas of both government and business. This practice would be assured under present operations by specific designation of funds for engineering participation.

Farm Waste Disposal

Farm waste disposal is of immediate major importance. The present rate of support for work on this problem is entirely inadequate. Present methods and principles being used in the field are inadequate in most instances. Research on new methods and new concepts must be immediately initiated. Work on methods for developing and improving or supplementing present methods should be continued and expanded. This is essential to answer the urgent needs of this critical problem.

Farmstead Water Supplies, Construction Standards and Planning

Work on ways to provide adequate farmstead water supplies should be continued and expanded. The demands for an increasing supply of pure water on farms must be met to maintain health and living standards. Work on farm building construction standards and farmstead planning should be continued at present levels.

Tillage Machinery and Soil Dynamics

The progress made in the tillage machinery research program is commended. Also recognized is the planning for the new facility currently being completed and the accompanying activities which it will permit. The Committee recommends that the National Tillage Machinery Laboratory be staffed and equipped to permit the development of this program.

It is recommended that the work of the Laboratory be further developed in the area of soil dynamics. It is peculiarly well suited to do this work due to the acquisition of personnel who by interest and training are

leaders in this expanding new field. By strengthening this activity, it is considered that results produced should expeditiously provide a basis for improved tillage and land leveling practices, and earth working equipment design so that more efficient soil handling can be accomplished.

CROPS RESEARCH

(The Committee reviewed those parts of the Crops Research Division program involving (1) basic and applied research or service activities that are not commodity oriented, and (2) studies with some cordage fiber and industrial crops.)

Plant Introduction and Development of Replacement Crops

The crop introduction program is clearly in the national interest. This type of activity, which is very expensive and requires a high degree of standardization and special skills, is especially suited for federal pursuit. This service is basic to and supports the whole national research activity in crops. The urgency of this program is predicated on the need for (1) securing endemic foreign germ plasm which soon may become contaminated, lost or generally unavailable as emerging countries develop, and (2) sources of new crops to successfully compete with acreages now producing crops in long supply. Expansion of this program is, therefore, recommended.

The agronomic development of possible replacement crops should be expanded to keep the program in balance with support for utilization research. Supporting effort is needed by bringing to bear the disciplines of plant breeding, soil science, agronomy, plant pathology, entomology and agricultural engineering.

The Federal government should also expand the program of commercial launching of newly-developed replacement crops to the point of commercial acceptance. This might require the underwriting of the cost of developing such special equipment as may be needed to commercially produce, harvest and process the crop in a usable form for industry. However, Federal participation should extend only to the point that industry is willing to take over commercialization of the crop.

Weed and Nematode Control

The Committee recognizes the excellent basic research program on weed problems. It recommends continued efforts at the present level in this important area.

General strengthening of nematology research is needed with emphasis on host-parasite relationships.

Mycology

Greater support is needed for identification and taxonomic studies and building and maintaining collections of fungi for use by research workers in both Federal and State areas, and for exchange with other countries.

Cordage Fiber and Industrial Crops

The work with crops yielding cordage fibers needs to be continued at the present level to preserve the potential of this important group to fill possible future industrial needs. Engineering progress has brought them much closer to economic reality.

Guar yields a gum resin useful in industrial adhesives. Large quantities are presently imported. Strains resistant to disease and successfully bred for desirable agronomic properties are close to development. The work should continue perhaps on a slightly expanded basis, as guar definitely has a possibility of becoming an alternate crop.

The present level of research expenditure on hops is adequate to meet the immediate needs if the work can be re-programmed and invigorated to reach the productive level of which the present well-trained staff is capable. An extensive re-evaluation to establish new criteria is necessary if the future needs are to be met. The important work of a State investigation, which has uncovered a significant decrease in yields due to the presence of virus in many commercial plantings, needs Federal support to aid in the solution of the problem and to make this work applicable to the entire producing region. This can best be accomplished by cooperative work. The new method of extracting may replace conventional handling of whole hops and may raise problems which will require future attention.

Mint is worthy of expanded Federal research effort. The substantial economic waste attendant with continuous geographic and farm-to-farm movement of the crop acreage can be alleviated if the verticillium wilt problem is solved. Two approaches, soil fumigation and varietal resistance, offer promise as means toward this solution. A larger effort in these directions could yield important and valuable results. Federal expenditure is justified by the widespread, 8-State, area of production.

Facilities for Winter Growing of Temperate Crops

There is a great need among plant scientists, State and Federal, for facilities to increase seed stocks, advance generations, and test plant materials in southern regions during winter months. No one area is entirely satisfactory for the growing of all crops in which there is some interest. It is recommended that the Department expand and develop facilities, as needed, in the United States and in other latitudes for winter growing of experimental stocks of these crops. The services so provided could be on a fee basis to offset a portion of the costs involved.

Tropical and Subartic Programs

The Virgin Islands' program, which includes extension, education, and research, has played an important role in developing agricultural enterprises on the Islands. As the local government gains greater competence in specific areas of this program, USDA emphasis can be reoriented or discontinued. There is need for continuing effort to develop food crops for the populace.

The exceptional research conditions in Puerto Rico make our Federal Experiment Station there irreplaceable. It is ideally suited to testing many programs and approaches for which continental facilities are totally unuseable. The very large contribution made in plant testing and winter increase alone justifies the continuation of this station. The actual and potential use over a broad array of tropical, sub-tropical, and temperate agricultural problems justifies some expansion as it becomes possible.

The research needs of Alaskan agriculture are great. This unique environment raises many special problems and offers unusual research opportunities. Expansion of research projects should be on problems that have regional importance to all States in the north as well as Alaska. Solution of the agricultural problems peculiar to this State would permit this segment of industry to make a more important contribution to the State's economy.

ENTOMOLOGY RESEARCH

(The Committee reviewed those parts of the Entomology Research Division program involving basic and applied research that are not commodity oriented.)

Improved Insect Control Methods

The Department's monumental research accomplishments in the area of biological, attractant and sterility methods for effecting significant control of insect pests is commended. These new methods illustrate the broad possibilities for effective control of many insects in the future and for minimizing the pesticide residue problem. Significant additional support should be directed to the above research and also to the search and development of host resistance to insects.

Insect Introduction, Identification and Classification

Foreign exploration, introduction, identification, and classification of insects for the effective conduct of programs of pest control and quarantine and the development of new methods of control and eradication of noxious insects and related pests is clearly in the province of the Federal program. The maintenance of this service at a high level is in the public interest in that it need not be duplicated by other research agencies. For these reasons increased support in this area is recommended.

Bee Research

The Committee believes it to be important that the new bee laboratory at Tucson, Arizona receive sufficient support to enable adequate staffing. In view of the relative economic importance of the bee industry and the great competition for agricultural research funds for urgent problems of broad national interest, it is recommended that no expansion beyond that requested above be considered. The possibilities should be fully explored for the development of a more effective cooperative program with interested local and regional research agencies.

